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ABSTRACT

Information resources can be considered a series of formal processes or activities by which the potential usefulness of specific information messages being processed is enhanced. These processes may add value to the information for the user. In order to increase the possibility that the information will be useful to recipients and users, information resources and systems must be efficiently and effectively managed. Certain components have been suggested as important to the development, marketing, distribution, and evaluation of user-oriented and value-added information services, systems, products, and activities in the vocational-technical environment. These components are the following: (1) strategic planning; (2) decentralization; (3) teamwork and self-managing teams; and (4) user-oriented value-added information and instruction transfer. Such transfer includes the following: enhancement of information attributes and effective, innovative information and instruction interfaces (especially competency-based instructional materials and information resources, program area departments and instructors, and education enhancement centers, such as mobile training labs, and on-site classrooms), and measurement of information systems, services, and products. Examples can be drawn from site visits in the fall of 1993 to three single-campus, exemplary vocational-technical centers in Oklahoma. The Model of the Reflected Factors of Information Usage (Turner 1992) illustrates the functional components and capabilities that support the constant innovation in the materials, systems, services, products, facilities, and personnel mirrored in the information and instruction infrastructure of these successful vocational-technical centers. These basic organizational and functional components and interfaces, associated with the user-oriented value-added approach to the transfer of information and instruction, can be emulated by all types of organizations. (Contains 30 references.) (KC)

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VALUE-ADDED SYSTEMS FOR INFORMATION AND INSTRUCTION AT VOCATIONAL-TECHNICAL CENTERS

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INTRODUCTION

Information resources can be considered a series of formal processes or activities by which the potential usefulness of specific information messages being processed is enhanced. These processes may 'add value' to the information (Taylor 1986) for the user. In order to raise the possibility that the information will be useful to recipients/users, information resources and systems must be efficiently and effectively managed.

How can the information-intensive organizations of today, particularly institutions involved in education, manage and provide value-added information for their users? The successful organizations, including vocational-technical centers, are participating in strategic planning activities, establishing self-management teams to accomplish tasks or projects, and adopting a decentralized approach to organizational structure and service/product delivery. These functional models or philosophical orientations increase an organization's ability to provide an effective and immediate interface between the information and the recipients/users.

Vocational-technical schools in the 1990's strive to bridge the widening gap between information and their students/end-users and local community constituents. To the extent that these vocational-technical centers are able to

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accomplish this goal, they are able to create measurable increases in productivity and competitiveness for their students, teachers, and local business/industry. How exactly do the vocational-technical centers bring information sources and information producers closer to their potential recipients in order to facilitate effective information and instruction transfer?

The social nature of information transfer found in vocational-technical centers, as well as in all other types of organizations, can be understood in the context of communication. In its simplest form communication has three elements: a source, a message/message channel, and a recipient (Murdock & Liston 1967).

Information comes to a recipient by a source that may be either a person, an organization, a hard copy or electronic document, or some form of multi-media/technology. A personal source may be the ultimate source, or he/she may be acting as a channel. A dominant source may be identified by the recipient as the true source or as a channel for the information. Thus, the distinction between the ultimate source of an informative message and the intermediary channel through which it passes is not always clear to the recipient.

Information channels link sources and recipients. The channels support the information transfer process. Effective information interfaces facilitate the reception and usage of the content(message) and the channel (medium or carrier of content) for the recipient/user. In the context of vocational-technical centers, these information interfaces are represented by:

* Individualized, user-oriented, self-paced, and competency-based curriculum materials/information resources;
* Autonomous Program Areas linked to appropriate business/industry knowledge base; and
* Education Enhancement Centers, on-site classrooms, mobile training labs - all providing information "on demand".

These information interfaces reflect the user-oriented and value-added approach of vocational-technical centers. This approach enables them to develop and provide information resources based on a dynamic knowledge base and multiple service delivery options.

The focus of this article will be to illustrate the importance of certain components to the development, marketing and distribution and evaluation of user-oriented and value-added information services, systems, products, and activities in the vocational-technical environment. These components are:

* Strategic Planning
* Decentralization
* Teamwork/Self-Managing Teams
* User-Oriented Value-Added Information/Instruction Transfer, which includes the:
    - Enhancement of information attributes,
    - Effective, innovative information/instruction interfaces, especially the following:

(1) competency-based instructional materials and information resources;

(2) program area departments and instructors;

(3) education enhancement centers, mobile training labs, and on-site classrooms

- Measurement of information systems, services, and products

Primary examples are drawn from on-site visits in the fall of 1993 by Betty Boyd, a graduate student in the School of Library and Information Studies at Texas Woman's University, to three single-campus, exemplary vocational-technical centers in Oklahoma: Francis Tuttle Vocational-Technical Center, the largest (in student population) single-campus vocational-technical center in the state; Eastern Oklahoma County Area Vocational Center, with a medium-sized student population of about 500; and Chisholm Trail Area Vocational Technical Center, the newest in the state, with a student population of about 100.

Strategic Planning

Strategic planning continues to be an important buzz-word for the '90s, because it has been demonstrated to produce results, to accomplish goals, to serve the cause of progressiveness. Fundamentally, strategic planning is ongoing and

systematic (Crowley 1992, 11). In keeping with other characteristics of the Information Age, it is long-range rather than short-term (Gardner 1987, 26). And--importantly--it is participatory.

> Newer planning models stretch [the traditional, top-down] framework horizontally, placing more information...and power...in the hands of more people. And more information--hard and soft data--from more sources is synthesized in the process (Gardner 1987, 24-25).

John Crowley, a Connecticut library/media center director with experience in educational restructuring, describes the critical elements of strategic planning as (1) environmental (external) scanning, (2) program (internal) scanning analysis, (3) organizational analysis, (4) vision and mission statements, and (5) action plans (Crowley 1992, 11).

One of these elements, the **vision**, must precede all other elements, according to Gardner (1987). He defines strategic vision as "a clear image of what you want to achieve, which then organizes and instructs every step toward that goal." He goes on to list several ways in which a team or a group or an organization can develop a strategic vision--by examining assumptions, searching for trends and developments, or selecting preferences and finding others with similar desires (p. 25).

Peter F. Drucker (1992) believes the mission of the modern organization "must be crystal clear," and that "only a focused and common mission will hold the organization together and enable it to produce." Without the mission, the members of the organization will "follow their own specialty rather than apply it to

the common task," and members will "define results in terms of their own specialty and impose its values on the organization" (p. 100).

The phrase **strategic planning** is not just verbiage to the vocational-technical centers in Oklahoma. All of the visited Oklahoma vocational-technical schools have vision and/or mission statements, and they have strategies for implementing their goals. More importantly, they **work** from these missions, goals, and strategies, and they make decisions based on them. For example, the mission statement of the Francis Tuttle Vocational-Technical Center located in far northwest Oklahoma City is "to increase the quality of life and enrich economic stability and growth by providing educational opportunities for the communities we serve." Francis Tuttle superintendent, Bruce Gray, in a television interview said that the school's mission has changed because of "new and emerging technologies," and that the institution is market-driven with a goal to educating students in "total systems concepts," rather than the drill and repetition routine which may have been sufficient for employability many years ago (CSTV 1991).

Jan Powell, Instructional Services Director at Francis Tuttle Vocational-Technical Center (FTVTC) for most of its 13-year existence, when asked if there was a collection development policy in place to guide the school's material resource holdings, immediately responded, "No. This doesn't fit us at all; it doesn't go with [how we accomplish] our mission and goals" (Powell 1993). More research revealed that the material resource holdings of FTVTC, like those at other vocational-technical centers, are guided by program area departments which have

their own policies, written or unwritten, about material resources for specific program areas/departments.

Strategic planning, as a dynamic and interactive process, occurs every year at Francis Tuttle Vocational-Technical Center. For example, the Strategic Planning Team Agenda for FTVTC, in its April 13, 1993 draft form, included six institutional goals. By November, after a series of institutional team planning and departmental team planning discussions, those goals had been increased to eight. Even these were in "working document form," according to Bruce Campbell, Director of Finance, who indicated there would be further, final revisions. Campbell added that the various program areas of the school had already developed their own goals and strategies based on the revised institutional goals (Campbell 1993).

The creating of the vision statement and its attendant mission statement and goals absorbs every director of every program area at Francis Tuttle. There are 34 program areas in this 1400-student school (daytime enrollment only; not counting the 20,000-plus part-time and adult enrollment) on the 80-acre campus. The director of each program area meets regularly with his/her program area instructors, with student representatives, and with community business and industrial leaders. An upside-down pyramid reflects this grass-roots "hierarchy" in which every team contributes to the forming of the vision statement and remains a vital part of the drafting and re-drafting process until all goals and activities are finalized and the plan is complete several months later. Everyone informs and is informed in and by the process.

Francis Tuttle, who founded the school in 1981 and ushered its move to its present site in August 1982, has been called a visionary because of his masterful long-range financial planning. The school today receives 13 mills per capita in support from the school districts it serves, and a new Transportation Center facility is the latest to be constructed, having opened its doors in early 1994. Architecture and layout of the entire campus are bold and fluid, echoing the program structure of the school.

Effective visionaries must be excellent communicators and marketers, too. At least two formal meetings a year between program area directors and area business/industry leaders are mandated at Francis Tuttle. Word gets out--constantly--about new technology, equipment, and state-of-the-art programs at FTVTC. The communities that send their adults and high school juniors and seniors to FTVTC communicate with the instructors and other personnel at the center.

But communication doesn't stop there. A full-time media specialist and assistants produce and distribute videos for classroom learning and the news media. The instructional services director can provide a briefcase full of useful information about the programs and services of the school, including recent magazine articles. The budget director can exactly relate what percentage of the budget is allocated to instructional materials. The Allied Health instructors can fully describe their own library, complete with its own circulation and cataloging system. The students can tell of their most recent involvement in skills-area

competition. Participation and teamwork are not just words at Francis Tuttle Vocational-Technical Center, and active communication and marketing are the successful by-products.

Some libraries have begun to incorporate the vision concept and to include visionaries on their management teams. A worthy example is that of the hiring of Robert E. Cannon as executive director of the Public Library of Charlotte & Mecklenburg County (North Carolina) in 1986. His proactive approach changed a stagnating institution into "one of the most dynamic, innovative, and market-driven libraries in the country" (Fleming 1993, 32). Hallmarks of Cannon's plan included (1) **high-quality customer service**, (2) **a ten-year strategic long-range plan** built on "hot topics" in the community and on local and national trends that affected library service, and (3) **fostering strong relationships in the community** (Fleming 1993) (emphasis added).

Exemplary vocational-technical centers in Oklahoma have always operated on just such principles and strategies. Eastern Oklahoma County Area Vocational Center in Choctaw, Oklahoma, located in the northeastern part of Oklahoma County about fifteen minutes from Midwest City, declares:

> Our mission is to provide life-long professional and personal development by linking people with educational opportunities through **quality programs, services and activities**, enabling them to become **productive and responsible citizens** of the world (in untitled printout of vision, mission, and core values of the school) [emphasis added].

Decentralization

The rationale for decentralization is convincingly expressed by Peter F. Drucker:

> The need to organize for change also requires a high degree of decentralization . . . because the organization must be structured to make decisions quickly. And those decisions must be based on closeness--to performance, to the market, to technology, and to all the many changes in society, the environment, demographics, and knowledge that provide opportunities for innovation . . . . (Drucker 1992, 98).

Stueart and Moran remind us that the issues of centralization and decentralization refer not only to geographic or territorial dispersal but to the dispersal of authority as well (Stueart and Moran 1993). Decentralization of authority seems to be a prerequisite or at least a goal in an organization before self-managing teams are tried. This makes good business sense because, especially in large organizations, decisions are too numerous and diverse to be the domain of one central authority. Also, response time to local needs is quicker in a decentralized environment, and motivation of the participants is higher (Stueart and Moran 1993).

Geographically, end-users actually "prefer a more decentralized system because of its convenience and personalized service" (Steuart and Moran 1993, 110). Automation allows and makes possible more decentralization; people can experience geographically dispersed service of all kinds. With decentralization, it is possible to achieve the mission of an organization outside one room--or one building.

In information-rich or information-diverse environments, decentralization has been seen as a blessing or a curse. Thomas Watts opposed decentralization of academic or other library collections because of "the growing interdependence of knowledge, the inconvenience to users, the expense, the isolation of collections" and "[inadequate] communication between departments" (Watts and others 1983, 196). Those who favored decentralization debated Watts by arguing, variously, that current technology makes interdepartmental access possible (thus, cross-disciplinary) and that decentralization meets the different needs of each department's primary information users in more responsible and cost effective ways (see separate discussions by Woodsworth, Hibbard, and Atkinson in Watts and others 1983).

Beath and Straub (1991) explored the dispute over the retention or dispersion of information technology and personnel within an organization in terms of where the control needs to be and what is most economic. They contended:

> Departments . . . take on responsibility for information resource management tasks when the agency costs involved in dealing with a centralized service . . . become prohibitive. [Departments] also offer information resource management services to the individuals in their departments where there are economies of scale to be obtained at the department level (Beath and Straub 1991, 124).

Each of the twenty-eight area vocational-technical schools in Oklahoma is autonomous. Though under the umbrella of the Oklahoma State Department of Vocational-Technical Education for accreditation and evaluation purposes, each school has its own board of directors, elected by the communities whose school

districts are served. Each school has its own budget, largely dictated by the effectiveness of the working relationship between the school's various program areas and the business/industry leaders in those communities.

Each vocational-technical center considers itself responsible--and responsive--to those who pay the millage and/or contribute foundation grant moneys which help to support the school's operation. The needs of the community--and the employment possibilities in other areas--help to dictate the course offerings. For example, the Francis Tuttle Vocational-Technical Center agreed with the management of a Houston-based Annheuser-Busch plant that more high-tech trained applicants were needed for electrical and electronic supervisory positions. Tom Reel, a senior engineer at Annheuser-Busch, also specified that new applicants be highly motivated. Engineers and instructors at Francis Tuttle's High Technology Center proceeded to work with the Houston firm and to set up a program of intense, skill specific training for vocational-technical students in Oklahoma City. That program included four-month supervisory internships at the Houston plant. Upon completion of the course of study at FTVTC, and qualifying scores on subsequent tests administered by the Annheuser-Busch staff, FTVTC students with an eye to work in a major metropolitan area could start to work at an excellent salary. Reel indicated in a television interview that the industry-school partnership was so successful that Annheuser-Busch has continued to request it (CSTV 1991).

Another example of institutional autonomy and strong community orientation is taking shape in Carter County, Oklahoma. In the fall of 1993, the Southern Oklahoma Area Vocational-Technical Center in Ardmore and the local Uniroyal-Goodrich Tire plant announced plans for a $600,000 industry training center at the vocational-technical center site. The 10,959-square-foot steel building will be used for educating company employees and future employees in electronics technology and generic technology. Basic and advanced mechanical and electrical courses will also be taught in the facility. Monty Rigsby, the maintenance manager at Uniroyal, credited the idea to a similar project involving a South Carolina vocational-technical center and the Michelin Tire Company. Rigsby said the material taught in the courses at the Ardmore structure will be "90 to 100 percent applicable" to work done on the floor of the Uniroyal plant (Treat 1993, (A)1).

And in Kingfisher County in central Oklahoma, at the Chisholm Trail Area Vocational-Technical Center, founders of this five-year-old facility immediately went to work with local industries such as Pioneer Telephone and Hollytex. W. Charles Henderson, Adult Education Coordinator and one of the founders of the Chisholm Trail Area Vocational-Technical Center, explained in an interview (8 October 1993) that when specialized electronics training and computer training were needed by Pioneer, Chisholm Trail became involved. Likewise, Chisholm Trail's directors, instructors, and students became involved in supplying the skills and programs to meet the industrial needs of Hollytex, a yarn-spinning company

which sends its locally made products sixty miles south to Anadarko to be made into carpet.

Even before Chisholm Trail Area Vocational-Technical Center had its building (for two years the school held its classes in an old bank building), the leadership of the school worked with United States Gypsum on EPA requirements regarding hazardous communications and blood-borne pathogens. The school also helped to supply the appropriate electronics and electrical maintenance training needed by U.S.G. Additionally, the school's Allied Health instructor has worked with U.S.G. in presentations related to their specialized information needs (Henderson 1993). The Chisholm Trail-U.S.G. mutually beneficial partnership continues even today.

Teamwork and Self-Managing Teams

A "shared group task," rather than the completion of individual jobs, is the mind set of self-managing teams (Stueart and Moran 1993, 110). The self-managing work team concept, which has resulted in the redesign of overall work of major American companies such as General Motors and Prudential Insurance, is echoed in the vocational-technical experiences. Few libraries, on the other hand, have ventured into the self-managing work team way of functioning, although there are signs of change (Stueart and Moran 1993).

Jana Schilder, a Toronto-based consultant, reported on the success of companies who have used the self-directed work team concept to increase productivity and sales. Different from other employee involvement strategies, such as quality circles and sensitivity training, the self-directed work team is given "real

authority to act." Employees really are empowered to "take on more responsibility and make decisions in areas previously reserved for management." Managers are transformed "from bosses/dictators to coaches/facilitators. Facilitators help guide, direct, and support the team, but they don't control it" (Schilder 1992, 67-69).

April Bohannan studied the history of the self-management concept and described the role of the external leader. Like the corporations and businesses identified by Stueart and Moran, and by Schilder, Bohannan found that self-managing teams differed from other work groups in the group members' acceptance of responsibility for the group's behavior as well as its product. Quality control and production outputs, in other words, became the province of the teams rather than of the external leader or manager. But what an external leader could do for the groups was to "assure that the groups are given the resources, training, and encouragement they need to assume this responsibility." In fact, she explained, "self-managed groups usually function somewhere between complete external dependence and total self-managed autonomy" (Bohannan 1993, 18).

Just as each of the Oklahoma vocational-technical centers is self-managed, so, too, is each program area (Automotive Technology, Allied Health, Small Business Management, or whatever) within each school. The Oklahoma vocational-technical program area directors and instructors are treated as leaders in their own right by their superintendents and boards of directors. Having participated in strategic planning as a part of the institutional team, each director knows what budget he or she has to work with, and within that budget he or she

is free to order instructional materials in the format, the number, and the style most appropriate to the skills. To ensure that students (juniors and seniors in the cooperating school district, and adults) are exposed to the most recent trends in the industrial and business sectors served by--and serving--the skills areas (i.e., program areas), program directors go to whatever lengths their budgets will allow, to purchase/ provide the materials that they believe will produce the best qualified individuals to go out and immediately get the job done and, more than that, to model excellence. These materials range from videos, books, pamphlets, and periodicals, to computer-assisted-drafting software. Vendors' catalogs are helpful to a degree, but the instructor may prefer to ask the media specialist at his/her vocational-technical center to produce an instructional video on site.

Furthermore, the instructor/director does not usually need anyone else's approval to place orders. And, when the materials arrive, the instructors have their own system of shelving, marking, cataloging, listing, or otherwise designating the status of a product. CD-ROMs may be available in the same classroom, workshop, or instructional area. For example, Mitchell-on-Demand (created by Mitchell International, a division of Thomson Publishing Corp., San Diego) is computer software that allows the end-user to see on screen any automobile (and any of its parts) made in the last ten or twelve years. Mitchell-on-Demand is highly touted by the Automotive Technology instructors as an excellent teaching/ learning tool.

Program area directors at the vocational-technical centers don't practice old-style dictatorial management. They employ participative management and,

together with their various teams (students, co-instructors, local business leaders/liaisons), they create strategic long range plans, discuss ideas, get feedback, constantly assess and evaluate the effectiveness of their program and the quality of their instructional materials. They are not afraid of constant, purposeful change. The vocational-technical institutional "team"--and each program area team within--seem to practice what Peter F. Drucker preaches: "For managers, the dynamics of knowledge impose one clear imperative: every organization has to build the management of change into its very structure" (Drucker 1992, 97).

User Oriented Value-Added Information/Instruction Transfer

Information resources are (should be) managed, in order to "raise the possibility that the content of formal messages, that is, information, will be useful to a client or group of clients (students, businesses, individuals in the community, etc.) sitting in a particular environment with particular kinds of problems" (Taylor 1986, 8). Information processing activities, designed to enhance the information channel and content attributes associated with an information system, service, or product, add value for the user. Taylor's User-Driven Value-Added Model is in response to services being delivered and systems being developed that are content- or technology-driven to the exclusion of user concerns and issues.

Taylor's User-Driven Value-Added Model reflects three components of the information transfer process: (1) the user (person who needs the information from a formal information system in order to achieve a personal or work-related objective); (2) the interface (the interaction space between the content and channel associated with an information system and the user); and (3) the information system itself, including the processes, functions, or activities that add (or do not add!) value to the content and channel of items contained in or being processed by the system (Taylor 1986).

Enhancement of Information Attributes

The "value of information" is now being defined as the relationship between (1) the quality of the information content and the quality of the information channel, and (2) usage as specified by the recipient (Swanson 1987). The valuation of information is concerned with information attributes, such as:

Information Channel Attributes	Information Content Attributes
Ease of use	Completeness of information
Readability	Accuracy of information
Availability	Relevancy of information
Accessibility	Timeliness of information
Response time	Volume of information
Procedures to receive information	Currency of information
Written instruction for information use	Value of information

(Turner 1992)

Attributes are the foundation for the valuation of information by recipients. Central to the use of information are indicators of its quality as perceived by the recipient/user (Senn 1982; Swanson 1987; Zmud 1978). The value of information is said to have meaning only in the context of its usefulness to recipients/users. Additionally, value is also thought to be dependent on the degree of "fit" between the information provided and the recipients' "use environment" (Swanson 1987; Taylor 1986).

The 'values-added' reflect inherent characteristics of information, called information attributes. These attributes affect recipient choice and usage of information content and information channels. The items that characterize information attributes, such as accuracy, reliability, timeliness, etc, are the components of value analysis/assessment or valuation performed by the recipient(s) (Turner 1992). These information attributes can, however, be modified to create greater recipient/user satisfaction via the value-added processes endorsed by Taylor (1986). Thus, information value may be seen as a "continuum of value" as judged by the recipient/user. The valuation process is influenced by the perceptions of the recipient/user. Information is judged to have high value if use action is taken as a result of received information (Taylor, 1986). Therefore, the value-added approach may be the vehicle to begin clarifying why people make (or do not make) use of information and how they view the "benefits anticipated versus the costs incurred" (Taylor 1986, 221).

Effective, Innovative Information/ Instruction Interfaces

Whether it is a software program or a person, the major purpose of an interface is to facilitate and complete the communication process; and communication processes, according to Taylor (1986) are value-added activities. The system interface must help end-users learn (or get answers) from the information system in order to add value to the system (p. 56).

Vocational-technical centers serve as the information/ instruction interface for the education, the information transfer, and the economic development within their community, region, and, in many cases, their state. This concept represents a comprehensive model of education practice based on communication and collaboration among public and private sector entities. Vocational-technical centers regularly bring the community to the facility or the facility to the community (in the form of students and in the form of businessmen who contribute to the wealth of information and actively participate in strategic planning and in the interpretation of information) and send better educated, better qualified team-players back out to the community.

Educators and employers have long shared a common interest in the development and maintenance of a community's human resources. When this common interest leads to meaningful communication, increased economic development opportunities are the result. Economic development can be thought to have three major components: personal or human development, job/career

development, and community development. Each of these components is inherently education-based and information-based.

The ultimate test of the effectiveness of the interfaces within the vocational-technical center is the level of achieved productivity and employability of its students and the resulting improved economic climate of the community. Three of the most effective vocational-technical interfaces--interfaces that have not been replicated in other types of education institutions or in libraries/information centers, are discussed in the following three sections.

Competency Based Instruction - An Effective Information/Instruction Interface

Competency based education, one of the tenants of vocational-technical education, is predicated on the "User-Driven Value Added" conceptual model (Taylor 1986). The manner in which instructional materials/resources are developed and selected creates a strong interface among business/industry leaders, teachers, and students.

Vocational-technical centers provide instruction/information or teaching/learning interface within a competency-based framework through a variety of organizational mechanisms. Their competency-based approach to teaching and learning is designed to document the use and resulting impacts or outcomes of provided information/instruction.

Vocational-technical instruction/information is designed to build skills associated with specific job tasks. Relevant, required job tasks and skills are

identified by employers for specific occupational or job areas. Employers and vocational-technical instructors develop the curriculum and competency-based instructional materials. The criterion-referenced student performance measures for each instructional objective are based on input directly from business or industry. Vocational-technical educators and business representatives jointly establish, develop, implement, and evaluate the curriculum for increased student/employee and business/employer productivity. This educational practice underscores the interdependent linkage that exists among education, information transfer, and economic development. The competency-based approach definitely enhances the quality of services and products (appropriately trained students) offered by the vocational-technical centers and by the competitive posture of businesses/industries.

For example, each of the fifteen program areas of the Eastern Oklahoma County Area Vocational Center (EOC Vo-Tech) is engaged in dialogue with businesses and industries of the locale, both in formal meetings (again, at least twice a year), and in such activities as apprenticeships. Automotive Technology instructor Jim LaFevers takes great pride in being able to send students who participate in his two-year program out to businesses to test the students' knowledge of automotive systems **and to test their communication skills** (emphasis added). LaFevers' competency-based program is ASE-approved (Automotive Service Excellence) under rigorous standards, as are all Automotive Technology programs at Oklahoma vocational-technical centers. A communications specialist

at EOC Vo-Tech makes regular classroom/workroom appearances to remind Jim's students of the importance of accurate, technically correct, and complete written and oral expression on the job. Group and individual practices involve a range of sequential, explanatory, and descriptive speaking, reading, and writing.

In concert with about a half dozen other instructors working through the Oklahoma State Department of Vocational-Technical Education and the Midwest Curriculum Coordination Center in Stillwater, Jim LaFevers has served as a writer of Automotive Technology core books in his program area at the state level. The material is sequential and analytical and guides students not only to perform sound mechanical practices but sound technical reading and writing practices as well.

James Johnson, Automotive Technology instructor at Southern Oklahoma Area Vocational-Technical Center in Ardmore, Oklahoma, agrees. He says these books, other texts, ASE-approved manuals and the students' work sheets (not "busy work") are the bibles of the ASE-approved programs and are constantly updated. "Any resource more than three years old is unacceptable" for Automotive Tech instructional and reference purposes, added Johnson (1994) in an interview at his south central Oklahoma facility.

High quality customer service and strong relationships in the community, obviously, are fostered in Automotive Technology programs. The interface--the added value--is in the quality of the instructor as a communicative leader, acting as both team player and coach. The instructor/leader bridges the gap between high

tech information and the end-users who need and will apply this information (students and the businesses and industries they will become a part of).

Program Area Departments and Instructors - An Effective Information/Instruction Interface

Other important information interfaces which facilitate the reception and usage of the content and the channels for the recipient/user at Oklahoma vocational-technical centers are the Autonomous Program Areas (i.e., skill areas). Program area directors and instructors consciously apply the institution's mission and goals in their specialized fields; they also adhere to the accrediting criteria of the Oklahoma State Department of Vocational-Technical Education. But in their operations, the program areas are decentralized and autonomous. What works for one program area in one region of the state may not be suitable for the same program area in another region or county. The curriculum of each program area is decided on a local-needs basis, in consultation and in close working relationship with area businesses and industries.

The number and kind of program areas also vary from one locale to another, depending on amount of local millage, size of vocational-technical student population, and community/business demands and needs. For example, of the six skill areas offered at Chisholm Trail Area Vocational-Technical Center in Omega, one is Farm Business Management, which fits the agricultural emphasis of this north central wheat growing region. At Eastern Oklahoma County Area Vocational Center in Choctaw, there are fifteen skill areas, including Masonry and Electricity,

which fit well with the manual-industrial labor market of the Choctaw region. Francis Tuttle Vocational-Technical Center in Oklahoma City offers thirty-four skill area curricula, including at least one that is offered at no other vocational-technical center in the state--Instrumentation & Control Technician--and one that is available at only one other center, Respiratory Therapy Technician. Considering the medical facilities and varied industries in the Oklahoma City area, these two program areas seem well paced with local needs and trends.

All three of the exemplary vocational-technical centers visited for this study offer programs in Allied Health (or a similarly titled program). Among them, there are commonalities as well as distinctions commensurate with local employment opportunities. In the Allied Health classroom-workroom area of each center, a health library is maintained, overseen by the instructor and at least one assistant. At Francis Tuttle Vocational-Technical Center, the assistant is also an LPN (licensed practical nurse).

While using a certain number of materials required by the State Department of Vocational-Technical Education, the program area directors/instructors all modify their Allied Health curriculum, relying heavily on recommendations from their program area advisory committees which consist of three to twelve experts in the field.

Advisory committees play an important role in (1) verifying occupational, business, and industrial trends and (2) suggesting things that could/should be added to program areas' curriculum and materials (Underwood 1993). Formal

meetings are held with the Allied Health directors and committee representatives at least twice a year. Less formal meetings are held, too. Classroom plans are based on "what is driving business and industry" in each field, said Rick Ray, Assistant Superintendent for Secondary Instruction at Eastern Oklahoma County Area Vocational-Technical Center (Ray 1993).

At Chisholm Trail Area Vocational Technical Center, the Allied Health program, which trains high school juniors and seniors, shares its library with the Practical Nursing program (available only to adults). Computerized access is provided on site and via modem to the University of Oklahoma Health Sciences Center in Norman, stated instructor Carla Maloy in a telephone interview (19 October 1993).

At Eastern Oklahoma County Area Vocational Center, the Health Sciences Technology program includes "online access" in the Computer Health Technology lab nearby, and students participate on a rotation basis under the tutelage of a computer instructor. Instructor Lori LaFevers' students are college-bound, she said in a telephone interview (20 October 1993), and they are required to write research papers for her course. Accordingly, field trips to Rose State College in Oklahoma City and the Health Sciences Center on the campus of the University of Oklahoma at Norman provide extra opportunities for research and library use.

In the Allied Health library at Francis Tuttle Vocational-Technical Center, there is a newly installed, computerized Winnebago Library System which will eventually be used for "circulation and inventory and search for topics," according

to Allied Health program director, Jody Wemhaner in telephone interviews (8 and 11 November 1993). This system runs on a CD-ROM network within the school, and all of the holdings are being bar-coded. All library holdings can be accessed by subject.

The Allied Health program areas, acting as user interfaces, link the information content (material resources and knowledge) and the information channels (computers and personnel). Modifications of curriculum and degree of access to material resources are unique within each vocational-technical center's Allied Health division. Value is added by timeliness, relevancy, and currency of information as well as by accessibility, availability, and procedures to receive information (Turner 1992).

Education Enhancement Centers, Mobile Training Labs, and On-Site Classrooms - An Effective Information/Instruction Interface

Education Enhancement Centers

Facilitating the information delivery process of many Oklahoma vocational-technical centers are the Education Enhancement Centers. These centers are, in effect, another kind of interface which makes the knowledge base of the program areas easier for the students to use. EEC's have their own budgets, their own networks (between and among EEC's of other schools), their own policies, and their own ways of meeting needs in the community, such as applying for federal grants to start adult literacy courses. According to Rick Ray, Assistant Superintendent for Secondary Instruction at Eastern Oklahoma County Area

Vocational Center at Choctaw (telephone interview 21 October 1993) the EEC is operated with federal dollars through the Carl Perkins Act. These federal funds also pay for a co-op counselor for the disadvantaged and the handicapped.

In Oklahoma City, a Francis Tuttle Vocational-Technical Center brochure titled Student Services [undated] identifies the Education Enhancement Center as one of six especially meaningful services to adult students. The other five services are financial aid, the displaced homemaker/single parent program, non-traditional training for women, job placement assistance, and the recruitment/enrollment program with its open-entry/open-exit policy allowing adult students to enroll as space is available and with specialists assisting as needed.

Specific EEC services available for all Francis Tuttle Vocational-Technical Center students are listed as vocational reading and math instruction; adult basic skills (including ESL verbal communication instruction); assessment/evaluation (of learning styles, career interests, and academic needs); and "other services" such as job readiness or ACT workshops, guidance in the use of materials ranging from reference books and periodicals to microcomputers and audiovisual equipment (FTVTC Education Enhancement Center brochure, undated). An Eastern Oklahoma County Area Vocational Center brochure mentions vocational-related vocabulary, upper level math, the use of BASE (Basic Academic Skills for Employment) software, and group and individual tutoring/ instruction among its many offerings in skills, methods, and services for students (Paint a Bright Future with the Education Enhancement Center at Eastern Oklahoma County Area Vocational

Center [undated]). Availability, an information channel attribute, and completeness of information, an information content attribute (Turner 1992), plainly characterize these two Education Enhancement Centers in Oklahoma vocational-technical schools.

The larger vocational-technical centers may have more than one EEC director. EEC directors are fully certified through the Oklahoma State Department of Education. Some EEC instructors/ directors, like Nancy Seeley of the Eastern Oklahoma County Area Vocational-Technical Center, are also certified in Special Education. They are accustomed to simplifying procedures for information access and to employing instructional designs variously geared to the learners' reading levels. Clearly, the EEC service of the vocational-technical experience provides added values in at least three information channel attributes among those identified by Turner (1992): (1) accessibility, (2) readability, and (3) procedures to receive information.

The Education Enhancement Centers (EEC's) are autonomous, just as are the program areas, and they have a designated space within the vocational-technical facility, just as do the program areas. EEC's of the large vocational-technical centers, such as Francis Tuttle Vocational-Technical Center in Oklahoma City, have small-group rooms within the larger room or unit. Technical writing, reference book use, and extra reading practice are the types of activities conducted in these smaller rooms, while the main work of the EEC is more visible in the larger, computer-lab-type room.

Whatever the number or kind of rooms within an EEC, the director and staff are busy performing their main function--to facilitate learning for everyone who enters the door, to remove any barriers to such learning, and to narrow the gap between the knowledge and the users who need it. The whole approach of the EEC is user-friendly. "We're here to help. We just want them [the students] to enjoy learning," said Nancy Seeley, EEC director of the Eastern Oklahoma County Area Vocational Center in Choctaw, in an on-site interview October 8, 1993. "We serve anyone that comes through the door, whether it's special-need adults, handicapped, visually or emotionally impaired--students the same way. According to the [laws relating to] the handicapped, we cannot turn anyone away." Obviously, then, two of the channel attributes identified by Turner (1992), ease of use and accessibility, exist in abundance in the Education Enhancement Centers.

The equipment in the EEC's is the latest that can be afforded. Previously existing equipment and materials are kept only if they work, not meaning only if they operate, but meaning appropriate to the individually styled and paced, constantly evolving learning strategies. Computers and computer programs are custom-selected to furnish help to students at their own level of learning, whether low or advanced.

In the EEC's **interprofessional cooperation** is a daily practice, an added value for the information users (students as well as teachers). The EEC director works closely with program area instructors to complement the curriculum of each content area while at the same time selecting materials according to student needs

in reading, writing, vocabulary, math, and other applications. The volume, currency, and relevancy of information, identified as content attributes by Turner (1992), are unquestionably supplied in the Education Enhancement Centers.

Another practice of some Education Enhancement Centers that helps to transform the recipient of information into the user/learner needed in today's at-work society includes the free lending of materials. EEC directors of different centers network and share with each other. Similarly, if a student wants to borrow a book from the EEC to take home to read or review with another member of the family, out goes the book. Usually it is returned, but, as Nancy Seeley explains it, it's more important for that book to help the person who needs the information in it. Old approaches to management of information resources are discarded in this type of environment, as such approaches do not seem to fit the content-to-channel, multiple delivery options of the Education Enhancement Center service at the vocational-technical schools.

In summary, all of the teaching of the Education Enhancement Centers, whether to other faculty in establishing rationale for individualized learners' plans or to students in carrying out those custom-made plans, relates to the competency-based outcomes which are a part of the vocational-technical mission and goals, and to students' performance with instruction and information.

Mobile Training Labs

Other unique interfaces for multi-channel delivery options offered by Oklahoma vocational-technical schools are mobile training labs and on-site

classrooms. Designed for the mutual benefit of area businesses and industries, the future or present employees of those businesses (including vocational-technical students), and special populations, this manifestation of the outreach concept has proved highly successful.

The Francis Tuttle Vocational-Technical Center's Mobile Computer Lab, resembling a blue and white space shuttle on wheels, conducts up-to-date software training for employees of companies at their business location. "The only space we occupy is in the parking lot!" declares a brochure which describes the software application workshops and training alternatives available to area businesses through this self-contained, generator-powered motor home replete with color monitors, laser printers, VCR deck, sound system, etc. A company or organization can choose from Lab-based workshops such as those on database management systems, desktop publishing, and computer networking. Or the Lab's instructional staff will develop specialized courses to meet the specific needs of the company or organization.

Or, if a company prefers, the training sessions can be held on the campus at the Francis Tuttle facility, in the multi-million dollar Business Education Center. Many area industries and companies are listed as satisfied customers of FTVTC's instructional design and delivery, whether conducted in the Mobile Computer Lab or at the Francis Tuttle Center. User satisfaction would seem to net a high score in every one of Turner's seven information content attributes (1992): completeness of information (judged by adequacy of detail and completeness of coverage),

accuracy, relevancy, timeliness, volume, currency, and value of information. Information channel attributes of availability, accessibility, and response time would seem also to top the scale.

On-Site Classrooms

During construction phases of the vocational-technical centers, classrooms were "made" out of existing facilities in businesses and schools that were supporting the center and would be sending students for vocational-technical training. An example is the Chisholm Trail Area Vocational Technical Center in Omega, Oklahoma. The first two years (1988-1990), short-term adult classes were located in the towns of Kingfisher (in Kingfisher County) and Watonga (in Blaine County). "We served people on their doorstep. We served Kingfisher people computer programs and adult education at their local high school, simultaneously serving Watonga." W. Charles "Chuck" Henderson, Adult Education Coordinator of the Chisholm Trail Area Vocational Technical Center continued:

> A lot of times we hired the instructor and hired the business right along with it, so we had a place to have the program, some training, and . . . we used their shelves and their tools. We usually took a sheet for a screen and provided an overhead projector and everything else (Henderson 1993).

For special populations, off-campus classes of Chisholm Trail Area Vocational Technical Center are arranged by Susan Bode, Certified Counselor of the school and Coordinator of the Chisholm Vocational Cooperative. The CVC consists of nine area high schools, including the three "sending" school districts in

Blaine and Kingfisher Counties which help to support the vocational technical school. According to Bode in a personal interview at the Chisholm Trail Area Vocational Technical Center October 8, 1993:

> The students that we serve [through the Chisholm Vocational Cooperative] are either economically or academically disadvantaged, advantaged, or disabled. That can include special education students. . . . This program is totally federally funded through [the] Carl Perkins Act (Bode 1993).

Among the services coordinated by Bode and conducted at the nine schools by Chisholm Trail instructors and counselors are (1) providing tutorial assistance in vocational and academic coursework to students; (2) providing occupational interest assessments and a "Career Exploration Seminar" for eighth grade students; (3) individualized guidance, counseling, and career development for students at their present level of education and for post-secondary employment (Chisholm Vocational Cooperative brochure, August 1993). According to Bode, the CVC program meets the differing needs of each school as well as of each person. As in the Education Enhancement Centers, then, the Mobile Computer Lab and the On-Site Classrooms are user-oriented. The added value of the many information channels and the variety of content lies in knowing student/user information needs and in responding to them, flexibly, day by day.

Evaluation and Measurement of Information Systems, Services, and Products

An essential component of any organization's efforts to remain relevant to the clientele it serves is the ability to measure the service and associated

processes. What cannot be measured cannot be controlled; and what cannot be controlled cannot be managed and improved (Harrington 1991). There must be a total measurement system rather that a collection of unrelated and potentially counterproductive measures (Rummler and Brache 1991). Education and information, managed as cooperative and collaborative systems, can benefit greatly from this measurement point of view.

The Model of the Reflected Factors of Information Usage (Turner 1992) is proposed as a measurement system model which (1) incorporates the identification and definition for the multifaceted variables associated with information usage; (2) provides a structure for examining the relationships among these variables; and (3) measures the user satisfaction with received information. The Model includes the following components:

- Participating Individuals
  - Information Seeking Behavior
  - Demographic Characteristics
- Information Use Environment
  - External Factors
    - Participating Individuals
    - Communication Occasion
  - Internal Factors
    - Attitudes of Recipient
    - Attitudes of Participants

Information Impacts

Information Usage

Information Channel Attributes (User Interface)

Information Content Attributes

The Model of the Reflected Factors of Information Usage

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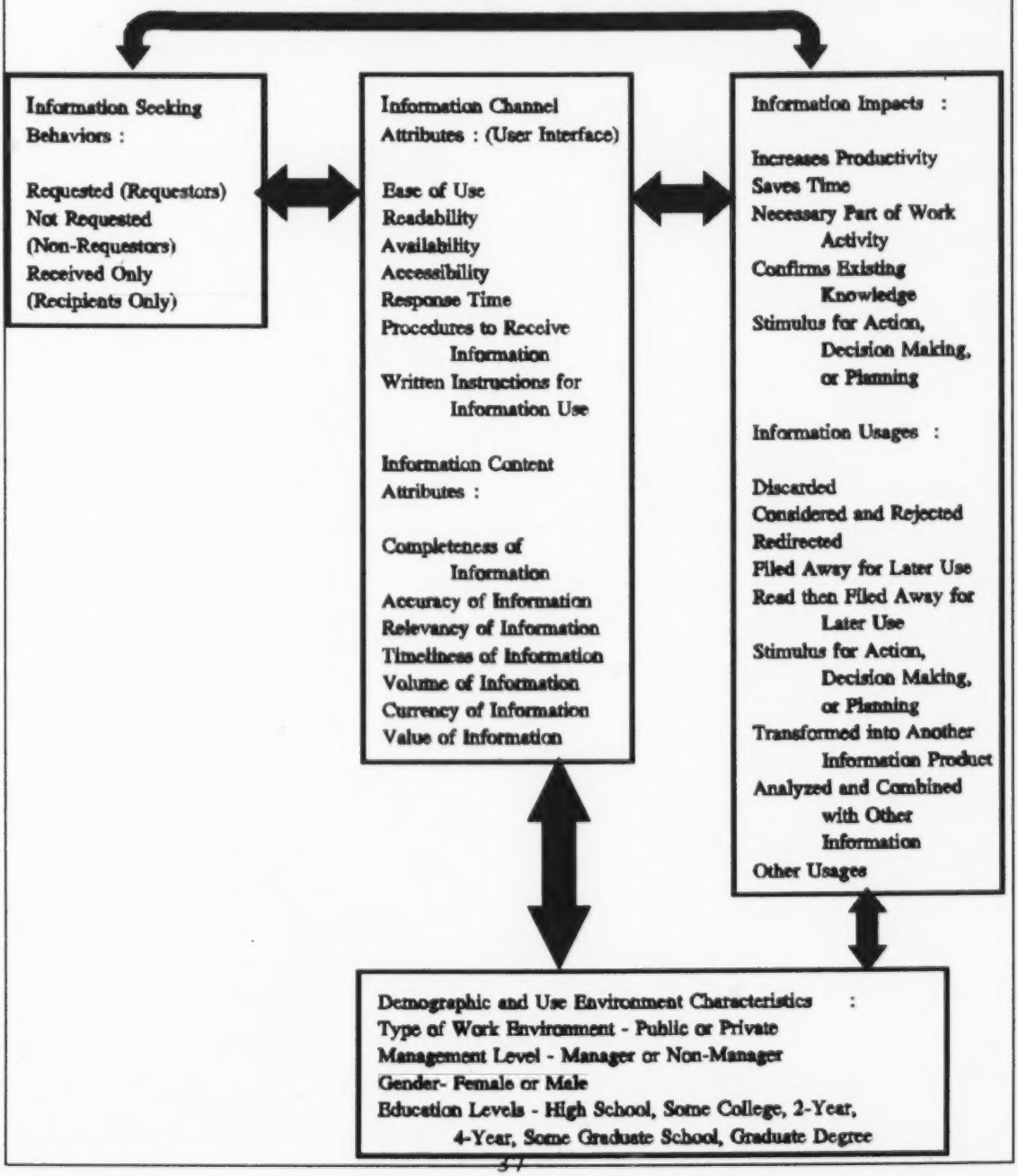

This model provides for the measurement of user satisfaction with information systems, services, and/or products. Vocational-technical centers can use this model to analyze and interpret (1) the critical functions and relationships of their information transfer and utilization processes, and (2) the valuation activities accomplished by recipients/users. The centers can use this knowledge to address and control channel and content information attributes and the user interface(s) in information system or product design and delivery.

Additionally, this model (Turner 1992) can be used to incorporate analytical methods of business and marketing research to measure recipient/user satisfaction. The specific satisfaction model used in this research is the attribute model (Bailey and Pearson 1983; McGrath 1983) which allows the identification and examination of relative weights of various attributes and associated relationships between these attributes.

The Model of the Reflected Factors of Information Usage is offered as an organizational structure and technical methodology that may be used to facilitate the transfer of information and instruction at an institutional, departmental, and individual level. Clearly, it is a model which many vocational-technical centers have adopted or can adopt in order to encourage optimal utilization of existing education and information resources.

CONCLUSION

Information and instruction must be productively utilized in order to have positive impacts for recipients. Users' satisfaction is significantly related to their

usage (or non-usage) of received information/instruction. Therefore, producers and distributors of information and instruction must be able to monitor and measure recipient/user satisfaction with the information channel and content attributes associated with any and all information/instruction products, systems, or services.

The Model of the Reflected Factors of Information Usage (Turner 1992) serves to highlight the functional components and capabilities which support the constant innovation in the materials, systems, services, products, facilities, and personnel mirrored in the information and instruction infrastructure of these successful vocational-technical centers. These basic organizational and functional components/interfaces, associated with the user-oriented value-added approach to the transfer of information and instruction, can be emulated by all types of organizations.

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